



Sixth Framework
Research Programme
**Global Change and
Ecosystems**



Multagri Project

Multifunctionality of agriculture and rural areas:

**From trade negotiations
to contributing to sustainable development.**

New challenges for research

Capitalisation of research results on the multifunctionality of agriculture and rural areas

Summary of main results

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List of abbreviations

CEEC:	Central and Eastern European Country
CORC:	Concept Oriented Research Cluster
DC:	Developing Country
EU:	European Union
FAO:	Food and Agriculture Organisation
MF:	Multifunctionality
NCO:	Non-Commodity Output
OECD:	Organisation for Economic Co-operation and Development
RD:	Rural Development
SARD:	Sustainable Agriculture and Rural Development
SME:	Small and Medium Enterprise
SD:	Sustainable Development
WP:	Workpackage
WTO:	World Trade Organisation

This paper intends to present the main results of the Multagri research project. It is a summary of the various reports (available on www.multagri.net). Special emphasis is put on the parts concerning **decision support for European policies**.

1 Introduction

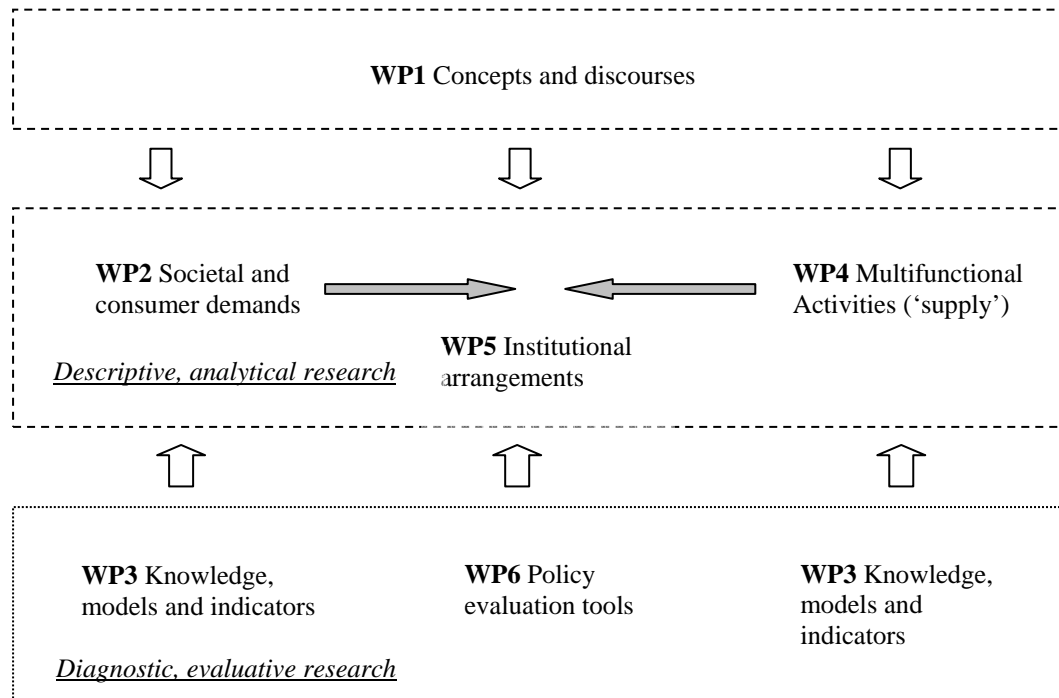
As it emerged in the 1980's and spread in the 1990's, the word "multifunctionality" took on several conceptions, according to scientific disciplines, countries, stake-holders. This multiplicity of conceptions and works on multifunctionality was the starting point of the MULTAGRI project. The idea was to clarify the issues raised by the concept of multifunctionality at the European level through a review of the **state-of-the-art** of existing research and the identification of **research gaps** and needs **to construct a solid base for future research**. The project starts from the hypothesis that **multifunctionality is a way to achieve sustainable development**, thus questioning the similarities and differences between these two notions.

This report will present a comprehensive overview of the achievements and questions identified transversally in the different thematic axes of the project. It suggests directions for an analytical framework for multifunctionality, based on conceptual considerations, and gives insight for its possible implementation, supported by methodological considerations.

2 Methodology

MULTAGRI is organised in 6 thematic axes (workpackages), designed in an **interdisciplinary perspective**.

Figure 1 - Conceptual, analytical and diagnostic thematic axes



Through the choice of partners and expert, the coordinators of the project tried to extend the geographical coverage to the whole EU-25, and even to a more global perspective (United-States, Southern Countries).

3 Multifunctionality of agriculture and rural areas: a frame for analysis

Multifunctionality appeared progressively, as the result of complex dynamics between society, policy and research through interconnected but autonomous processes. It arose in the mid-1980's but it was due to its uptake in the international trade arena the 1990's that it became widely addressed. With Agenda 2000, it became a policy concern at national and European level. It rapidly spread in very different contexts and with different meanings.

WP1

Within research, different issues emerged, bringing various disciplines to work together. To allow a better comprehension of this diversity, WP1 elaborated **a framework to analyse the different streams of research**. The focus of the typology is the research questions addressed and the concepts mobilized and the research activities implemented to address them. The different research works identified for the state-of-the-art were classified according to these criteria, allowing the identification of eight different Concept oriented research Clusters (see table in annexe):

- A joint production of commodities and public goods
- Multiple impacts and contributions of agriculture to rural areas
- A complementary and conflicting connection between commodities and identity goods
- Farmers strategies and practices
- Multiple use of rural space and regional planning
- Adjustment between activity systems and societal demands as a way toward sustainable agriculture and rural development
- A societal demand towards agriculture
- Governance, policy and multifunctionality

These CORCs display the variety of understandings existing with regard to MF. However, they are not static categories; this typology is open to further evolutions.

Currently, research seems to be in a consolidation process to gain credibility facing the political discussions. Many of the debates seem to emerge from the **undifferentiated use of two conceptions of multifunctionality**: multifunctionality as an objective, and multifunctionality as a frame for analysis:

- the discredit on the legitimacy of policies for multifunctionality has hampered research on multifunctionality as a framework; this has particularly been the case within FAO;
- the varied application of multifunctionality as a goal has been considered by research as looseness and made it difficult to design and adapt a common framework;
- the confusion created by the distinction between normative and positive definitions proposed by OECD, as well as the real difficulty to isolate both dimensions has prevented research to position itself in an analytical perspective.

However, multifunctionality seems to be a promising paradigm to analyse the transformation of agriculture and rural areas. Therefore, we suggest that research should detach itself from multifunctionality as a political goal and **only consider multifunctionality as an analytical framework**. This supposes determining the basis of this framework and strengthening it. In the next parts of the report, we try to give directions for the construction of this framework, as follows:

- in part 4, the different **elements that are forwarded by research as constitutive of multifunctionality** will be presented to discuss what could be an original analysis framework;
- in part 5, the works on **governance and multifunctionality** as a societal and political goal and insight is given through the elements identified for a future analysis framework;
- in part 6, we identify the limits to current research on multifunctionality and discuss the **needs for a future analysis framework**;
- this will lead us to part 7 where the **research gaps** are identified.

4 Multifunctionality: three components for an analytical framework

As multifunctionality was progressively adopted by research, three issues emerged as focus points for the scientific debates:

- the interrelations between functions;
- increasing the links between agriculture and society;
- the relation between multifunctionality and sustainability.

4.1 Functions and their interrelations

WP1

Although the OECD approach, based on jointness and its implications, appears as the most prominent approach when dealing with interrelations, most of other research works on multifunctionality also consider interrelations between functions. Nevertheless, from one approach to the other, there are strong differences between the functions considered and the way of considering the interrelations linking them.

WP2

WP4

No list of functions can be considered as absolute, **relevancy of functions is highly contextual**. Many studies chose to follow the sustainability concept by distinguishing three groups of functions: economic, ecological and social. The identification of functions is generally very static; almost no works deal with their evolution in the past (historical generation, appearance...) nor the potential development (of further functions) in the future.

Acknowledging that a single activity may simultaneously fulfil several functions is trivial. However, if the interrelation between functions is seriously taken into account in analyses, it profoundly challenges the analysis. Links between functions were already partly considered for the analyses of other agricultural systems. **The difference introduced by multifunctionality is that it places interrelations in the centre of the analysis**. Many types of interrelations are identified, but their intensity is rarely taken into account in studies, although it is the fundamental point to understand linkages.

A few systems have been developed to assess functions and their interrelations, but there is clearly a need for more integrative approaches (see frame below).

Frame 1: What methods for assessing functions and their interrelations?

WP3

Do some research works provide guidelines to determine indicators for related functions?

It must be noted that in our state of the art, **most of the diagnosis tools do not affect all three dimensions of agricultural functions** (economic, environmental and social) **and they are studied separately**. This mostly derives from the fact that indicator sets have been developed in an independent way without any strong link to the MF-concept. Many of the indicators surveyed were conceived as indicators of sustainability, not as indicators of MF. They could be used as they – at least in theory – cover the three dimensions and thus, offer a classification for the functions that agriculture potentially provides. However, the sustainability indicators do not necessarily have the desired orientation and degree of differentiation to characterise multifunctionality of activities. At the moment no guidelines for designing indicators of multifunctionality exist with few exceptions, like **indicators for landscape functions**.

For all indicator systems, the issue of aggregation of different indicators is a problem. The number of indicators used can rapidly be very high, and consequently, it can be very difficult to use them for synthetic information. Hence the question of simplifying this information is put on the table. **Aggregation is even more critical with multifunctionality because different types of dimensions exist, with different measurement systems**. One option often chosen is to evaluate indicators monetarily, so as to transform analytical data into one unique value. Other methods summarize multifunctionality into three criteria: agro-ecological, social, economic and compare dimensions with graphs. In other methods, this

aggregation focuses on objectives, such as the contribution to landscape, which includes ecological information (presence of hedges or of isolated trees), cultural information (architecture of farms), and visual information (colours of agricultural areas in each season).

Contribution of models for analysing interrelations

Considering the difficulty to combine functions through indicators, models could be more appropriate to understand interrelations. However, few existing models deal with several functions at once.

The models examined tackle a limited number of functions, mainly due to their development for specific purposes. This lack is due to the weakness of research on interrelations (technical, biological, social and institutional jointness) between functions, rarely specified and analysed which could feed into models. Cross modelling between disciplines is at its beginning. If economic functions and environmental functions are linked in models, few of them are linked with social functions.

4.2 Re-embedding agriculture in society

Most studies which consider that interrelations between functions are the fundamental element of multifunctionality often **neglect the demand side and concentrate on the supply side** of multifunctionality. However, as it concerns functions, multifunctionality opens the field to more integrated analyses, in relation with the evolution of wider societal objectives.

New views on demand

WP2

In this context, multifunctional agriculture is considered as a consequence of the **changing needs and demands of consumers and society at large towards agriculture and rural areas**. Most studies dealing with consumer and societal demand towards agriculture and rural areas address its components separately: demand for quality food production, for environmental, ecological and landscape values, and for social and cultural aspects. However, there are clear **correlations between these three dimensions of demand**. Therefore, some researchers put forward that this demand is likely to be of multidimensional nature, rather than directed to exclusively one dimension of agriculture and rural areas. Some studies are trying to address demands through a multifunctional framework. One example is the "basket of goods" analysis: a group of complementary goods and services which strengthen each other on the local markets (traditional regional food production, local craftworks, tourism, typical landscapes) are studied jointly.

New views on supply

WP4

Parallel to the evolution of demand, many farmers have engaged in **new activities, through new strategies such as diversification, pluriactivity**. Three directions are distinguished: **deepening activities** (adding more value to products, with organic farming, high quality products, on-farm processing, short supply chains); **broadening activities** (development of new activities, such as management of nature and landscape, agri-tourism); **re-grounding activities** (pluriactivity or cost-reduction through alternative use and valorisation of internal farm resources). Economic driving forces have some importance in these changes, but these approaches have revealed to be inadequate to explain the perseverance and rationale of pluriactivity and diversification. More recent research material emphasizes that agricultural activities are at least partly to be understood as the outcome of non-economic driving forces and motivations. Indeed, there is a sort of reconfiguration of rural identities, through a change of activities of traditional actors or because of new actors (neo-rurals, SMEs). Therefore, the analysis of multifunctionality presupposes the inclusion of a much broader spectrum of organisational forms than the simple dichotomy between professional and non-professional farms. Much work is still needed to be able to assess the contribution of the "non-productive" actors on the environment, landscape, maintenance of rural areas.

New views on the links between agriculture and society

WP5

WP2

WP4

As agriculture is placed within a more global perspective and re-embedded within society, new ways of taking into account the **links between agriculture and society** are emerging in research studies. **Markets and policies**, which are classically considered as connecting points between agriculture and society are still relevant and many studies investigate / study their evolution within a context of multifunctional agriculture (see part 5 on governance for more details). However, new approaches are being adopted, notably in terms of **networks and institutional arrangements**. **Media** (notably internet) or **education systems** are the newest issues emerging: their role of communication and exchange between rural and urban society is often underestimated and much research work still has to be done in this area.

Another promising type of approach considers **space** as the meeting point between agriculture and wider society, making **territory a central category**. Rural areas are no longer automatically strongholds of farmers but increasingly represent multiple realities in which farming has to co-exist alongside with other land-uses and interests. In the productivist agriculture paradigm, production is not linked to space. Some approaches of multifunctionality still insufficiently address the **role of contextuality**, social networks, transformation processes and dynamics in time. Several research works and impact analysis show that in developing a multifunctional activity, as short chains, quality foods, agro-tourism, diversification, nature and landscape management, farms build new relations between agriculture and society, city and countryside. This supposes **passing from a sectoral (agricultural) perspective to a territorial one** towards more integrative approaches, permitting to analyse farm or land uses activities in connection with other activities of the territory, as well as their contribution in building new territories that in return become resources. In no way does this exclude the farm-based approach of multifunctionality. Multifunctionality of agriculture and multifunctionality of rural areas are complementary, they allow to analyse different levels.

Frame 2: What models to help understand links between agriculture and society?

WP3

Are there models reflecting the links between agriculture and society in a MF perspective?

Models reflecting the links between agriculture and society need to take into account at the same time the producer and the consumer (if we are in economics) or citizens, farmers and other stakeholders (in a sociologist perspective).

Macro-economic approaches tend to analyse demand and supply of commodities with the help of modelling approaches like general equilibrium models, which are able to analyse the interdependencies of different sectors with respect to their commodity production and related resource usage. However, these models in general do not include non-commodities because of their large scale perspective, which hinder them to take site specific ecological functions but also community dependent social interdependencies into account.

One group of micro-economic farm level modelling approaches based on programming techniques - the so called bio-economic models¹ - integrate information or models analysing the ecological functions of agriculture. Only few approaches tried to include demand information (mostly as external variables).

More in line with the demand form models, reflecting links between agriculture and society, are interactive Multi-agent models, combining citizens, farmers and stakeholders reactions. Some models have been crossed with cellular automats and/or GIS to simulate the evolution of land use. They can be used to compare scenarios with role plays implying different actors. This can facilitate exchanges in a participative process. However, these models are at the beginning and existing studies are concentrated on a limited geographical area. It is still to prove that these approaches can be applied also at larger spatial units.

¹ "bio" refers to biophysical models, which can be process based, dynamic models or simple expert based rules.
Multagri project: Summary of main results. September 2005.

4.3 Multifunctionality as a pillar of sustainable development?

If the issues of interrelations between functions and links with society are at the heart of multifunctionality, they only take on a true meaning through a third issue that has been in the centre of many debates: does multifunctionality bring insight to sustainable development?

Initially, the Multagri project was based on the **hypothesis** that for agriculture to be sustainable, its multifunctional dimension must be acknowledged and promoted. However, as we came to differentiate multifunctionality as a goal and multifunctionality as an analytical framework, this hypothesis evolved: ***“By understanding more about multifunctionality, it will be possible to better address sustainable development”***.

The **relation between multifunctionality and sustainability** is generally considered implicit and is rarely mentioned explicitly by research, often leading to confusion between both terms. In all countries surveyed, there is a notable lack of scientific attention for the specific interrelations between these two concepts. This led us to clarify both terms:

- **Sustainability** is a **normative approach** that has to do with society's wish and ability to preserve current consumption levels. It is a **resource oriented notion**: it requires to maintain some aggregate measure of capital (stocks of physical or economic, natural, and social capital, and the possibility of trade-offs between them), in order to fulfil the needs of future generations. Thus, it has a clear temporal dimension.
- **Multifunctionality** is an **activity/outcome oriented notion** that describes characteristics of farm production or outcomes from lands, focusing on relationship. It lacks a direct or immediate temporal dimension. In many research works, it can have a normative acceptance, but we chose to restrict it to an **analytical approach**.

Can multifunctionality, defined as such, bring some help and input for making development more sustainable? Multagri researchers consider that **MF can provide a useful analytical framework that helps to operationalise sustainability**, in particular since it is based on activities and functions. This framework supposes to clearly identify and analyse the functions through activities, their combination and the social demand. As we can see on figure 2 the link between sustainability and multifunctionality is made **through the impact activities may have on resources**. Descriptors of the characteristics of the systems should help to assess how the system can be modified and what could be the impact of changes. But the main contribution lies in the possibility it offers to look at a range of possible options and at the way of addressing thresholds. In return, sustainability provides the criteria that are needed to make the analytical framework operational. Connecting multifunctionality to sustainability also requires taking into account the time and space dimensions.

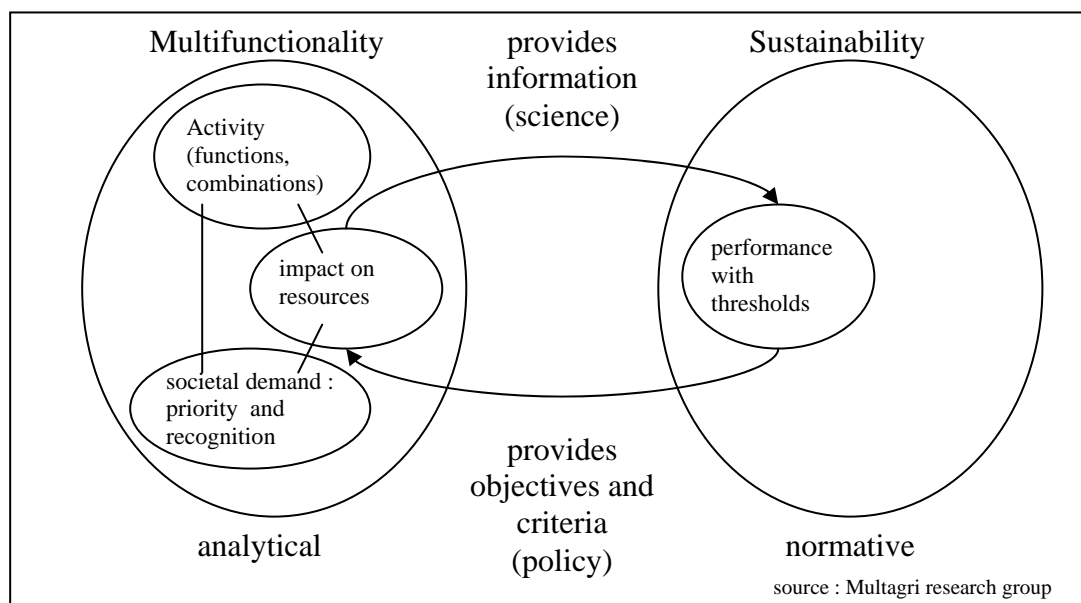


Figure 2: formalisation of links between multifunctionality and sustainability

With respect to sustainable development goals, the relevant functions have to be assessed with regard to their social, economic and ecological impacts. Hence, indicator systems need to be systematically combined with norm-based threshold and goal values. However, few indicator systems and models differentiate these two notions.

Frame 3: Multifunctionality and sustainability models and indicators

WP3

Linking activities and resources

Very few indicators of multifunctionality have been identified in research works in relation to activities. Most indicators are indicators of impacts, which are close to indicators of sustainability. Developing such indicators is indeed useful in order to follow the state of resources, but in practice they often reveal to be un-operational since this is done without link to activities. Connecting indicators with activities could allow understanding in a more realistic way the keys to sustainable development, thus enabling a better monitoring of the system. However, few research works have been carried out with this perspective. In Germany, “Kraichgau” and MODAM attempt to combine the farm economic approach with environmental issues, i.e. on impact of resources. Kraichgau allows studying nature development areas and includes like MODAM multifunctionality indicators as a restriction or side effect, where MODAM tries to cover all relevant areas of ecological sustainability based on simple fuzzy evaluation modules analysing production practices. .

Conclusion : Multifunctionality as a framework to study complexity

Multifunctionality offers a new way of considering agriculture and rural areas through the interrelations between multiple dimensions, multiple sectors, multiple stakeholders, multiple levels, etc. It replaces complexity and contextuality within the centre of analysis. The three issues underlined within our state-of-the art (interrelations between functions, place of agriculture within society, relation with sustainable development) could be the components for a future analytical framework as they underline this complexity.

5 Multifunctionality and governance: research analysis

Although researchers are turning multifunctionality into a framework to analyse complexity, it is first of all a social and political concern. As there is a growing recognition of the multiple roles and functions of agriculture, a large diversity of mechanisms and procedures is being devised to enhance them.

5.1 New perspectives on governance?

WP5

A wide range of governance modes has been studied by research with respect to multifunctionality: **Policies**, as they are disputed in trade negotiations, have focused most research attention. However, ***studies mostly deal with the choice of types or instruments, in a theoretical way.*** The modes of implementation of policies are rarely dealt with, as well as the evaluations of policies, although some partial aspects, such as acceptance by farmers or society are treated.

WP2

WP4

Other modes of governance, such as **markets** and **new institutional arrangements**, are starting to be studied in relation to multifunctionality, although mostly through **case studies**. However, if a lot of research works has been done, in most of them, there seems to be ***no theorization, common method or systematic data collection.*** Research essentially plays the role of an identifier and disseminator of new ideas. Analysis and identification of strong and weak points and comparison of the different experiences are often missing.

In both these cases, research does not really use a new multifunctional analysis framework, although some works are being developed in this direction, **through new questions specifically put at stake by multifunctionality:**

How to address interrelations through policies? Multifunctionality, by introducing links between functions, raises the question: Are policies which address multiple goals more efficient than policies which address these goals separately? Several theoretical issues are raised. Technically, targeting consistent policies towards non-commodity outputs through commodity outputs is difficult because the jointness is not straight-forward. Politically, coupled policies are considered as distorsive in the global trade, and are considered taboo within WTO. Institutionally, the differences of transaction costs between different types of policies are not well known. In practice, addressing interrelations has already been done through territorial policies. However, little research exists to assess sectoral versus territorial approaches.

How can contextuality be addressed by policies? Multifunctionality has revealed the importance of taking into account the local conditions (resources and demand). This raises various questions:

- Defining at what scale an issue is considered as homogenous, or at least not too variable, and thus the target unit.
- How to give the possibility at a defined level to adapt policies according to local needs, through subsidiarity? This raises the problem of multilevel governance, notably because priorities for multifunctionality are different at every level. Very little research is carried out to study the articulation of these different priorities and the conflicts resulting from them. Research should also look into the gap between the intentions of policies, designed at national or supra-national level, and their impact and goal achievement at local or regional level.
- Studies generally focus on one problem (pollution, landscape, employment, etc) to determine what level should be considered, but multifunctionality implies thinking the various problems simultaneously, as they are linked through joint products.

5.2 Impact assessment: methods, tools and models for governance

WP6

Evaluation of policies has become an important component of the policy process with the reform of the EU structural funds in 1988. The key question is how multifunctionality goals and concerns can be integrated into evaluation concepts and practices. Although various assessments measure the impacts of policies on agriculture and rural areas, they generally focus on one dimension. Evaluation procedures and guidelines adapted to the concept of a multifunctional agriculture and rural space yet have to be developed.

One of the main difficulties is to devise **adequate methods** for multifunctionality. Some important **limitations of conventional evaluation approaches** are identified: besides the lack of both data and useful indicators for quantitative methods, it is hardly possible to assess the wider effects of programmes: 1) it seems to be rather difficult to isolate the specific effects of a particular measure from other impacts; 2) the impacts of medium- or long-term programmes are normally not measurable at short notice. As a consequence, methods tend towards being **qualitative and ad hoc**, that is without having a sound qualitative evaluation framework. Some works see LEADER programmes and their evaluation as an interesting example to be deepened. More importantly, the institutional dimension of policy implementation and of policy evaluation needs to be taken into account: Institutions play a major role and they are of a very diverse nature. The key question is how joint platforms of quantitative and qualitative methods could look like.

One of the greatest challenges is to devise **appropriate tools** to help governance, by linking concepts from different disciplines like landscape planning, agricultural sciences, social sciences, macro-economics, micro-economics with the adequate levels, scales, demand and supply tools. Most tools used for policy support are assessment models (see frame 4), but methods valuating demand are also being developed (see frame 5). Both of these tools are often partial, but more integrative methods are appearing. These developments must be done with the participation of policy makers, to be able to deliver satisfactory outputs for decision support.

Frame 4: Indicators and models used so far for impact assessment

WP3

In the context of policy impact assessment studies, models can be applied in three types of assessment situations: models for ex ante studies, models to support policy implementation and models for ex post (evaluation) studies.

Models for ex ante assessment of policies

• Assessing policies with economic models: interest of macro-economic models

Macro-economic simulation models can perform relatively well – although under rather restrictive hypothesis on market functioning – at a very aggregated level. Macro-economic approaches are well suited for ex ante analysis of market mechanisms and to study linkages between different sectors. This is a reason why they are still used at world or EU level for impact simulations of trade policies. Because of aggregation issues and the difficulty to model dynamic effects, they are of little help for the analysis of ecological functions as well as for the analysis of social functions.

• Assessing the supply of commodities and non-commodities: Bio-economic models

A major distinction concerning the purpose of such approaches is between predictive studies (which take the current situation as starting point) and explorative studies (which consider biophysical opportunities). Some studies simulate the impact of policies on decision making whereas others take strategic or tactical goals as a starting point and assess the potential or actual contribution of certain measures or practices to these goals.

At the farm level, optimisation models, based on linear programming, are mostly used. Some of them dealing with ecological functions of agriculture are formulated as constraints which can be used as balance rows to calculate impacts per scenario or to restrict land use. At the regional level, some models combine agro-ecological models with economic models to compare the best management practices at a watershed or landscape level. New

methodological developments integrate objectives at different scales, from field to landscape. Besides scenarios, results of this type of models are often displayed as trade-off functions, which show the interdependencies of different indicators under certain frame conditions.

Tools for policy implementation

The main tools devised for policy implementation are farm diagnosis tools. These tools are used to analyse actual farm performance, measured with a number of economic, sometimes social and mostly ecological indicators. In some cases, the tools are used to optimise ecological performance of farms (by implying the decision-maker, that is the farmer), in others, the tools serve only to control farm activities related to payments, and in a third category, results of farms activities are empirically measured and used to determine the level of second pillar payments to these farms. However, these diagnosis instruments can also be applied at the regional level in order to enhance awareness and communication among land use stakeholders on the impact of their activities

Ex post policy impact assessment tools

Examples of ex post policy impact assessment tools exist in the Netherlands at regional scale and in Germany at field and farm level. The Dutch model chain “Nature planner” has been developed to explore and assess regularly the relations between spatial land use structures and biodiversity. However, these models are limited to one or few functions (e.g. biodiversity maintenance) and often are regionally specific applications. Nevertheless, they often contain interesting modules, that could further be developed for incorporation in ex ante assessments.

In conclusion a number of tools and models are available to help explain and forecast MF, although none of the modelling approaches were explicitly designed for the examination of multifunctionality of agriculture and rural areas. Large research projects like the 6th EU-framework project “SEAMLESS” are currently trying to combine in an innovative way bio-physical, economic farm models and macro-economic approaches. However, the coverage of ecological and social functions is limited. The question remains in how far these approaches can be combined with more qualitative analysis with respect to social policy impacts.

Frame 5: Possibilities offered by valuation studies

WP3

Assessing the demand: demand based economic valuation of agricultural Non-Commodity Outputs (NCOs)

Estimates for relevant farming-related NCOs represent valuable information for MF assessment, because they show economic importance of environmental and cultural functions of agriculture in some areas, e.g. in Natural Parks and Mountains areas. Although the number of valuation studies for farming-related NCOs in EU countries is continuously growing and that some of them had been funded by Agriculture Ministries or related services and programmes, there is not, nor at EU level, neither in the countries considered, an institutional frame to apply valuation results to public decision-making.

• Preference for direct valuation techniques

Various methods have been used for valuation of demand: direct valuation methods (contingent valuation - CV, stated preference - SP) and indirect valuation methods (travel cost, hedonic price). Most studies demonstrate the potential of direct valuation techniques (notably CV) for handling farming-related NCOs diversity and standardising difficulties. Their flexibility in terms of valuation scope, definition of object to be valued, and the application field, converts them, especially when valuation scenarios are based upon changes in sets of attributes, into a useful tool for multifunctionality assessment.

• Interest of the multi-attribute valuation for multifunctionality

Valuations often cover only one type of attribute: landscape and landscape-related attributes, nature and biodiversity conservation, or food safety. However, new methods are being developed for multi-attribute valuation. These methods seem to be particularly useful in the

MF context for three main reasons. First, it allows a more precise definition of the valuation object, which is an essential issue to make value estimates for farming-related NCOs readable for non-specialists and applicable within an institutional frame for MF assessment. Another reason for experts' preference towards multi-attribute valuation is that it allows gathering people's answers to the questions: Which attributes and how much of each should be supplied in a particular area? And in which areas should a particular attribute be supplied and how much of it? Third and most importantly, it allows taking into account the interrelations between attributes.

- **Contextuality and transferability**

The prevalence of regional scope for valuation objects can be explained by the local/landscape scale of most of the farming-related NCOs. This regional scale turns estimates transferability more difficult, but this scale is a typical characteristic of most of the farming-related NCOs. People value these outputs' singularity and contribution to regional identity.

To base these models and methods on appropriate data, new data sets and observation tools need to become more advanced in order to describe better the multiple roles and functions of agriculture and rural space (frame 6).

Frame 6: How suitable are available data material and statistical systems?

WP4

WP6

Data systems still largely focus on production, income and markets - the classical constituents of the official agricultural statistical systems – and parts of it are clearly obsolete today. There is a need to update these information systems.

FADN data base

This appraisal refers in a specific way to the Farm Accountancy Data Network (FADN), the most important European data base concerning farm data. Launched in 1965, it is the only source of micro-economic data that is harmonised. It provides a systematic overview about single farm data. Holdings are surveyed on the basis of sampling plans established at the level of each region in the Union, but are selected according to size which can be considered as commercial. However, it is lacking issues and data which are fundamental for current analysis and research on agriculture and rural development such as environmental data and more integrated information.

Other data bases

There is a range of other European data material of relevance for the analysis of MF: statistical material on SMEs, data sets on ecological performance indicators as collected within LUCAS and CORINE, ongoing attempts within the LEADER programme to develop social indicators on the liveability of country-sides, etc. From a MF perspective, however, available data-sets show some fundamental limitations:

- Available farm-based data sets on socio-economic developments **are not integrated with area based** (GIS) data-sets on environmental performance indicators, impeding insight into interrelations between indicators.
- Current **sectoral fragmentation** of statistical data sets contain important barriers for a better understanding of the relevance of inter-sectoral interaction as well as overall farm household income developments.
- Current "snap-shot" statistics limit insight in the dynamics of farm development models. **More longitudinal data collection systems** could draw specific attention to the dynamics of rural areas, including the role of farms as breeding places for other SMEs and the relevance of differentiating farm development models in terms of changing land use patterns.

6 Conclusion: Can the introduction of multifunctionality re-orient research?

This state-of-the-art on multifunctionality has revealed that multifunctionality does not only represent a new research issue but probably a new way of comprehending agriculture and rural areas. How has this affected research?

6.1 What does the state-of-the-art reveal on current research?

Several observations were made in the different WPs with respect to research on multifunctionality:

- Concerns linked to the various functions of agriculture are ***predominantly expressed through other concepts than multifunctionality***, such as diversification, sustainability, environmental measures. This induces confusion between the use of the different words, notably multifunctionality and sustainability.
- Current research on the multifunctionality is ***highly fragmented***. The different issues surveyed in this state-of-the-art generally deal with the different functions in a segregated way and are not carried out in a multifunctional purpose with a global approach.
- The scientific disciplines mobilized are mainly of social sciences. The ***contribution of other relevant scientific disciplines*** (natural sciences, rural planning, landscape architecture) would be important in order to understand relationship between farm output and other functions. Some researchers within these disciplines, such as agronomy, have started to adopt the word and launched new works.
- ***A consistent conceptual framework is largely lacking***. Methods that fully correspond with the concept of a multifunctional agriculture and rural space yet have to be developed.

In this survey, the relevant published research seems to be in the continuation of previous works on other issues. Modifications are very localized and linked to special issues (trade negotiations). The integration of multifunctionality goals and concerns into research concepts and practice is a more recent question.

6.2 Specific contributions of Multagri for future research on multifunctionality

All these observations reveal the ***necessity of clarification and deepening around the concept of multifunctionality***. During the Multagri project, we tried to determine some relevant directions for the deepening of research and devised different frameworks to contribute to a further reflection on multifunctionality:

- WP1 has defined ***Concept Oriented Research Clusters*** (CORCs) to present, compare, analyse and classify the different research issues studied (see table in annexe). It can serve as a basis to understand the diversity of research and the opportunity to integrate partial and complementary knowledge that has been produced according to specific patterns. It remains an open classification.
- WP2 has raised the question of ***the role of political, social or market forces*** and has tried to assess their contribution in special case studies. The role of selected factors (geographical, ecological, economics, demographic, political etc.) on the evolution of demand for multifunctionality was also tested for each case study.
- WP3 has devised in an iterative way an ***evaluative framework for assessing the suitability and transferability of existing methods, techniques and models*** related to multifunctionality of agriculture. It is based on a list of main criteria, to identify the key elements of each model and method.

- WP4 analysis has been driven by the construction of the different ***critical questions on farm activities and rural populations***. Several typologies have been suggested to take into account the diversity of activities in a multifunctional perspective.
- WP5 has differentiated the ***different types of policies*** that are in link with multifunctionality so as to facilitate further analyses. It stresses that different levels of decision-making and analysis need to be distinguished and their interrelations explored.
- WP6 offers a new perspective on evaluation processes, notably through a questioning of ***the relations between quantitative and qualitative methods***. It emphasises the importance of more consultative, discursive approaches (platforms, stakeholder forums, focus groups).

Some global considerations were also made during the synthesis work:

- As we presented in part 3, most studies surveyed reveal difficulty in placing the limit between positive and normative aspects. That was why Multagri member made the strong recommendation for research to consider multifunctionality as an analysis framework and not as a goal.
- Since a consistent conceptual framework is largely lacking and need more theoretical research, we suggested some directions for the orientation of this new research paradigm:
 - taking into account interrelation between functions;
 - re-embedding agriculture within society;
 - considering multifunctionality as one way to operationalise sustainability.

All these frameworks are a major methodological output, as a basis for future studies.

6.3 Towards new ways of making research...

Much more work is now needed theoretically and conceptually, methodologically, and empirically to consolidate the analytical framework for multifunctionality. However, more than new issues, new ways of making research must probably be developed:

- Regional and national institutions should collaborate to allow passing from one level to another, up to the European level;
- To evolve from analytical to systemic approaches, more interdisciplinary research is required;
- Developing constructivist and participatory approaches implies an increased link between research and society.

These directions will be detailed as we summarize the research gaps in the following part.

7 Research agenda

Overall there is a remarkable concordance between WPs in the outcome of the state-of-the-art reviews in terms of research gaps. In this presentation, they are differentiated between knowledge production of a more global nature, and research related to European policy formulation and evaluation. Reference is also made to the research needs related to EU enlargement and the particular concerns of developing countries.

Research related to knowledge production

More **conceptual research** is needed to determine multifunctionality as a promising framework:

- **Characterisation of the interrelations** between different functions from a theoretical point of view. Most existing work is analytical (incl. for example indicator-based policy evaluation). More systemic approaches should be renewed.
- Until now the notion of multifunctionality has mainly been referred to in agricultural policy circles. It should be **enlarged** through different approaches: environmental and land use research; socio-economic research linked to diversification of activities; institutional research on adjustment of institutions and arrangements that link demand and supply of multifunctionality; holistic approaches in a territorial context taking into account social, cultural, economic, technical, political and environmental dimensions.
- A more precise definition of the (potential) **contribution of multifunctionality to sustainable development** ought to be explored. Often it is assumed (and recognized) that there is some sort of link between sustainable development (agriculture) and multifunctionality, but until now it is only dealt with in a rather superficial way. Clearly, there is little rigorous analysis in the literature exploring the linkages and this is one area that deserves more research in the future. Key question: Can multifunctionality be understood as a set of functions that addresses key issues of sustainability?

Expressions of multifunctionality are specific in time and space. A more thorough **empirical review** seems to be needed to characterise activities, identities and institutional arrangements as well as to further substantiate relevant functions and interrelations.

- The comprehension of the **role of agriculture** (and of the tasks of farmers) in modern society differs widely. Closely related to that, there are significant problems in analysing the new additional roles and functions which are connected with multifunctionality.
- Very clearly more research is needed on the **demand side** of multifunctionality: Although the rediscovery of the multifunctionality of agriculture is mainly a result of societal changes, there is surprisingly little research about the extent, nature, location and valuation of the demand, specifically demands that go beyond food production.
- The **capacity of agriculture and rural actors** to respond to new societal demands and the changes required to allow agriculture to meet these requirements are largely under-researched.
- **Transition processes** at farm and at regional / territorial level and the related shifts in patterns of resource use have hardly been researched so far. This is surprising because a transition to a more sustainable society is one of the main current policy goals.

There is a clear need of **methodological development** to analyse multifunctionality: most existing research methods and tools have been developed for more analytical tasks and within rather tight disciplinary boundaries, and often they are more linear in conceptualisation. It is more and more recognised that they can only to a limited extent meet the challenges of more complex non-linear interrelations.

- **Modelling and valuating complex functional interdependencies:** Existing tools need to be further explored to see how they can be used in more integrated, systemic ways

and new methodologies and tools should be developed to cope more effectively with complex situations.

- In order to qualify and quantify the multiple services that agriculture provides to society more accurately, **indicator systems for multifunctionality** must be defined, using existing indicator systems (e.g. from landscape ecology, economics, social forestry etc.) and developing biotic and social indicators for agriculture. Specific research gaps exist with respect to aggregation and integration into spatial and time scale spanning hierarchies, their potentials to represent complex interdependencies without oversimplifying (i.e. vertical aggregation), and the elaboration of standardised classification schemes.
- Although some modelling approaches are used to simulate and assess trade-offs between various functions of agriculture, remarkable deficits remain with respect to **spatial and temporal scales**. Comparative studies on the strengths and limits of tools and instruments to upscale data from field and farm level to landscapes and administrative units (NUTS 1 and 2) as well as to assess impacts with different time horizons are necessary.
- The specification and validation of **bio-economic models** is a key question: For many agri-environmental indicators especially with respect to biotic resources our knowledge on the impact of agriculture is very limited. Fundamental agro-biological research is needed, in link with biological population development models.
- There are large deficits with regard to the **integration of social, demographic and institutional aspects into modelling approaches**. Data on possible social demand-supply functions should be done more systematically at a regional or national level to serve as input.
- Approaches and methods for **linking social needs and interests' satisfaction with the outcomes of agricultural activities** are of primary importance. Research on appropriate methodologies to involve stakeholders has only started recently and mostly remains either on a local level or operates with reductionist assumptions on human behaviour. Research is needed on the enhancement of participative, multiple stakeholder decision making processes.
- With respect to **sustainable development goals**, the relevant functions have to be assessed with regard to their social, economic and ecological impacts. Hence, indicator systems need to be systematically combined with norm-based threshold and goal values.

Research related to (European) policy formulation and evaluation

To define **policy-related research gaps** in terms of the practical needs of policy processes, we will refer to the three axes of the future Rural Development (RD) policy 2007-2013:

Improving the competitiveness of farming, forestry, the environment and countryside:

- In how far and in what ways does an increasingly multifunctional agriculture contribute (or hinder) competitiveness? Sectoral approaches and forms of intervention need to be contrasted with territorially based schemes.
- Multifunctionality of agriculture and international trade: What are relevant standards that are generally applicable? How can the 'jointness of production' be further substantiated? Which functions depend on public policy and which can be sustained by the market? What's the appropriate degree of state intervention? A critical assessment of the role of the state is urgently needed.

Improving sustainability, preserving our unique rural environment:

- Multiple land uses and sustainable land management strategies: Synergies and conflicting land use goals need to be explored and reference made to discourses on the segregation vs. the integration of functions. Does multifunctional land use contribute more to sustainable development goals than more specialised patterns of land use?

Rural development: Improving the quality of life and diversification of the rural economy; innovation and economic development in the countryside

- A more holistic concept needs to be adopted in research, focussed on the potential of agriculture to fulfil new societal goals, to contribute to rural employment, to improve the viability of rural areas, particularly in less favoured areas. Single target policies need to be compared with multi-target policies in terms of their effectiveness and efficiency.
- Assessment of the social functions of agriculture: What is its contribution to social sustainability? What are relevant indicators?
- Little is known about demand for non-commodity outputs although it is a crucial question in the political debate. Policy involves making choices where markets are missing and often decisions are taken in the absence of adequate information. More empirical analyses are needed on the effects of policy instruments on externalities (and on creating or correcting them) or on the production of non-commodity outputs.

Relevant institutional arrangements ought to be examined in terms of their potential role for reconciling incompatible interests in land use and, more generally, in rural space. Different levels of decision-making and analysis need to be distinguished and their interrelations explored.

Multifunctionality as a result of **multi-level transition processes**: Different levels of decision-making, policy formulation and implementation need to be distinguished and their interrelations explored. Appropriate governance levels for agricultural functions need to be identified, and the conditions of consistent and innovative policies in a multi-level governance system need to be explored, notably through a territorially focused research agenda.

Implementing more locally based **bottom-up approaches** to RD:

- Transformation, governance and practices to promote MF: What kind of institutional arrangements might for example help to overcome the gaps between the supply and demand of public goods? what are the implications of establishing new “markets” for MF products and services? What role can new producer networks (e.g. environmental cooperatives) and producer-consumer networks play? What kind of institutional arrangements are needed to reconcile incompatible interests in rural space?
- What is the role of intermediate actors (experts promoting innovations; non-agricultural stakeholders; “neoruralists”, SMEs)?
- How can institutions from different social, economic, technical, political and environmental domains coordinate their activities in more effective ways?

European level evaluation procedures and guidelines still have to be harmonized with the concept of a multifunctional agriculture and rural space yet have to be developed. The research gaps that are related to this and more generally to **impact assessment and evaluation** are:

- The **institutional dimension of impact assessment** and policy evaluation needs to be taken into account: Policy makers, administrations, stakeholders and academics from a wide range of disciplines from social, economic, technical, political and environmental domains are involved. A key question is how their interaction can be organised in effective ways in evaluation processes.
- The review of the practice and process of evaluation suggests that the lack of data is a major constraint for more comprehensive and more integrative analyses and assessments. **Information and data systems** are not yet aligned with current demands. More territorial and regional approaches towards monitoring and evaluation have to be developed. Data needs to be developed for non-commodity functions. At the same time it is necessary to pay sufficient attention to a harmonization of data systems and evaluation concepts. Scaling up and the assessment of EU level interventions must be possible.
- Up to now indicator-based approaches clearly predominate evaluations. More **consultative, discursive approaches** (platforms, stakeholder forums, focus groups, etc.) that are supported by hard data are vastly neglected. Classical tools like cost-benefit

analysis and (economic) models which show limitations when applied alone should be linked in creative ways with these approaches so as to better address the complexity of a multifunctional rural space.

- **More integrated assessments** focussed on the multiple impacts of particular policies and conditions on agriculture, local communities and the environment are needed. Until now emphasis often is on nature protection, environmental concerns (water, air quality) and landscape conservation. Other dimensions of multifunctionality such as community services, renewable energy, recreation and leisure and the linkages with non-agricultural developments, for example in gastronomy, are largely neglected so far.
- Questions that focus on classical socio-economical topics such as efficiency, effectiveness and policy impacts need to be complemented by **a more comprehensive analysis of impacts on territorial developments** and the appropriate degree of state intervention.

The challenges that new EU members states are facing are partly different from the challenges that have been referred to so far. In this section the focus is on questions concerning the process and problems of accession of the CEEC through particular **research needs related to EU accession**:

- How does **MF evolve in changing market conditions** in relationship with EU accession? What will be the effects of the new policy frameworks (in particular market and income policy) on the multifunctionality of rural space and in particular rural employment?
- **Land-abandonment** and un-employment are a major problem in many new EU members states. What will be its impacts on rural life and on the environment?
- **Ambiguities and impacts of SAPARD**: Has SAPARD for example favoured larger farms and does that affect the multifunctionality of rural space and the sustainability of agriculture?

Although multifunctionality is not clearly a policy goal in most **developing countries**, it is increasingly considered as an implicit frame of reference:

- Much of current research focus on market and NGOs, but it is **fundamental to replace the State in the centre of analyses**. Studies should be carried out on the possible role of the State for promoting multifunctional agriculture, taking into account the main demographic, economic, and geopolitical changes (international migrations, insecurity, illegal activities).
- It is important to understand more about the **impacts of Northern agricultural policies and cooperation policies**. This has strong implications on the choices that EU can make for cooperation programs.
- Empirical and comparative studies, as well as theoretical analyses, should be undertaken to device **possibilities of global governance** and its mechanisms.
- Understanding how to valorise multifunctionality functions on the market and how to develop an inclusive and fair private sector supposes more studies on different experiences and on market regulations.
- A better comprehension of **farmer collective organisation or institutional devices** which assure a number of functions without public aid or passing through markets could allow to device alternative supports. Methodologically, there is a need for reconsidering the “market” and “non market” categories.

Annexe1: Classification of the main CORCs explicitly working on MF or on related concepts (taken from D12)

CORC	Disciplines	Research questions and controversies	Use in policy making	List of related functions	Weaknesses or limits	Other concepts used	Related concepts
Joint production of commodities and public goods	Neoclassical economics	<ul style="list-style-type: none"> Jointness between agricultural production and other goods Efficiency of public policies, private arrangements, international agreement to deal with public goods and externalities Legitimacy of non-trade policy targets according to their impacts on international trade. 	<p>Coming from international debate (WTO, OECD)</p> <p>Main theoretical background used in the international debate and negotiations, then used at the national policy level</p> <p>Response to the need for “firm” if not “objective” arguments and information on the efficiency of farm policies</p>	<p>Environmental externalities and public goods</p> <p>Functions requiring public intervention in the light of welfare economics</p>	<p>Restrictive view of multifunctionality (mainly contributions to environment)</p> <p>Primarily driven by theoretical concerns</p> <p>Relatively little attention to assess function integration</p> <p>Partial analyses not adequate for effectively assessing the total value of agriculture</p> <p>Not adequate for southern countries</p>	<p>Externalities</p> <p>Public goods</p> <p>Joint production</p> <p>Non-marketable goods</p> <p>Other goods</p>	<p>Market failures</p> <p>Distortion</p> <p>Decoupling</p>
Multiple impacts and contributions from agriculture to rural areas	Economists Agronomists Geographers Natural scientists	<ul style="list-style-type: none"> Assessment of impacts / contributions (to employment, erosion prevention, water quality, economic development, etc) How to promote (or mitigate) those impacts and contributions 	<p>Coming from farm sector structural changes and changes in societal concerns</p> <p>Highlight the contributions of agriculture and the effects of policy measures for environment, employment, etc</p> <p>Design of existing concrete needs: like the efficient pricing systems for irrigation, and saving valuable water resources.</p>	<p>Wide-ranging lists of functions, collating all identifiable contributions or positive impacts</p>	<p>Works within this CORC often do not take into account the whole impacts of farming activities (negative impacts, economic costs) necessary to draw the relative merits of farming systems to fulfill the expected functions</p>	<p>Externalities (positive / negatives)</p> <p>Public goods</p> <p>Multiple effects</p> <p>Roles of agriculture</p> <p>New ruralities</p>	
A complementary and conflicting connection between commodities and identity goods	Institutional economics	<ul style="list-style-type: none"> Impacts of the liberalisation on identity Conditions for producing and trading such goods Determinants of public-policy reform 	<p>Coming from “non standard” economists in reaction to standard economics postulates and conclusions</p>	<p>Set of identity goods</p>	<p>Restrictive view of the determinants of policy efficiency</p>		<p>Market and non-market outputs</p>
Farmers strategies and practices: multifunctionality, technical change, livelihood systems	Agronomics Rural Economics	<ul style="list-style-type: none"> What is the interpretation of multifunctionality in terms of practices? To what extent has the recognition of multifunctionality led to changes in farmers’ practices 	<p>Coming both from politicians and farmers in a view of improving practices as a response to new social concerns</p> <p>Useful for the understanding of impacts of policies on environment, employment ...</p>	<p>Set of “good practices”</p>			<p>Technical choices, livelihood systems</p>
Multiple use of rural space & regional planning	Urban and rural planning	<ul style="list-style-type: none"> What is the contribution of function integration to maintain attractive or sustainable rural areas 	<p>Input for national debate on the pro's and con's of function integration as a way to deal with the scarcity of</p>	<p>Broadly defined, with a specific attention for nature, landscape,</p>	<p>Little specific attention for the multifunctionality of agriculture, focus on the</p>		<p>multiple use of space; green and</p>

	Landscape architecture Social geography	<ul style="list-style-type: none"> o How to organize spatial planning in line with changes in societal demands. 	national land and spatial resources	leisure, water management, expansion of living areas, infrastructure, etc.	potential of function integration at local and regional levels instead of enterprise-levels		blue rural services; public-private partnerships
A way toward sustainable agriculture and rural development (SARD) regulation	Socio-economics Political science Agri-economics Agronomy Rural sociology Geography Economics (institutional economy, regional economy)	<ul style="list-style-type: none"> o How can multifunctionality contribute to the renewal of countryside ? o How to support and activate rural population ? o To what extent can these functions contribute to SARD? o How can multifunctionality help implementing agenda 21 	Coming from government, to deal with structural adjustment consequences (Poland) Socio-economic impact of MF, its potential to contribute to SARD, the construction of innovative policy designs, etc.	Regional policy Agri-tourism, environmental Socio – technical infrastructure Social, environmental, agricultural and ecological functions landscape/nature service functions of rural areas' related to recreational and settlement activities. Broadly defined, with a specific attention for functions that represent (potential) public and/or private markets.	This CCRC is connected with sustainability but relates only to the people working in the agricultural sector Lack of adequate data material due to the dominance of sectoral approaches in statistical institutes, growing problems around the delineation of agricultural activities	Multidimensional Regional development Development of infrastructure Development of rural population Integrated agriculture, broadening of agriculture	Local and regional development Urban and rural development Social requirements Deepening, broadening and regrounding of agriculture, livelihood-strategies; new institutional arrangements
A social demand towards agriculture	Expertise Management Geographic economics	<ul style="list-style-type: none"> o Identification of social demands o How agriculture can address them 	Coming from government and scientists Useful for the understanding of the supply side of MF	Expectations from various social groups towards agriculture			Social requirements or expectations Sustainability
Governance, policy and multifunctionality)	Economic and agronomic expertise Political science and economics Epistemology	<ul style="list-style-type: none"> o To what extent is the multifunctional official objective consistent with policy measures (CTE, CAP measures) ? o Is multifunctionality a new paradigm for policy design? o What are the implications for the renewal of holding economic models ? 	Coming from scientists Useful for the understanding of the efficiency of a policy regarding its objectives	Set of functions of agriculture explicitly mentioned in public policies	Doubts from scientists on the scope of the will of public administration at the national and UE level to really promote non – production function of agriculture		Multiple contributions